

REMARKS

Claims 1 through 94 are currently pending in the application.

Claims 3, 6 through 16, 18, 19, 21, 24, 27 through 34, 36, 37, 39, 41 through 44, 47, 49 through 62, 67 through 79 and 81 through 94 have been withdrawn from consideration as being directed to a non-elected invention.

Claims 1, 2, 4, 5, 17, 20, 22, 23, 25, 26, 35, 38, 40, 45, 46, 48, 63 through 66, and 80 stand rejected.

This amendment is in response to the Office Action of June 20, 2003.

Claims 1, 2, 4, 5, 17, 20, 22, 23, 25, 26, 35, 38, 40, 45, 46, 48, 63 through 66, and 80 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Khandros et al. (U.S. Patent 5,998,864) in view of Burns (U.S. Patent 5,585,668) further in view of Haba et al. (U.S. Patent 6,376,904) further in view of Fogal et al. (U.S. Patent 6,051,886) further in view of Knopf (U.S. Patent 5,585,675).

After carefully considering the cited prior art, the rejections, and the Examiner's comments, Applicants have amended the claimed invention to clearly distinguish over the cited prior art.

Applicants further submit that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure.

Applicants submit that claims 1, 2, 4, 5, 17, 20, 22, 23, 25, 26, 35, 38, 40, 45, 46, 48, 63 through 66, and 80 are clearly allowable over the cited prior art. Applicant respectfully submits that it is difficult to ascertain precisely the way in which the references are used combination of the cited prior art in the rejection. For example, on page three of the Office Action, it is stated that "Khandros et al. fail to teach an offset structure during stacking." Applicant is forced to

presume that "offset structure," as used, pertains to something other than or more than simply the "offset stacking of die," because Figure 4A of Khandros seems to teach an assembly characterized by what Applicants would characterize as "offset stacking." As best Applicants can determine from the language on page three, first three sentences of the Office Action concerning the relationship between the disclosures of Khandros and Burns, it is viewed that Khandros teaches or suggests die stacking which is "offset," but in which the bond pads are attached to the lower surface of the die. See, for example, Figure 4A. Burns teaches or suggests bond pads on the upper surface of the stacked die, the bond pads being electrically connected to the substrate. See, for example, Figure 2, item 18 on the left side of the drawing. The argument, presented entirely from what is intended to be the perspective of the Office Action, thus becomes the following:

Khandros teaches the laterally-offset stacking of die, but not the use of upward-facing bond pads on the chip area exposed by offset stacking. Burns does teach the forgoing element in Figure 2. The combination of Khandros and Burns fails to teach that the bond pads which are connected with the substrate are on the upward facing exposed *edges* of the stacked die structure. Haba teaches bond pads which are distributed along the edges of the die which are exposed due to the method of stacking. See, for example, Figure 3A. Knopf teaches the attachment of bond pads of upper die to the pads of die directly underneath. See, for example, Figures 4-9. Thus all the limitations of Applicant's claims 1, 22, 45 and 63 are met. Fogal teaches the element taught by Haba, but it also teaches rotational offsetting (Figure 3), rather than lateral offsetting, thus satisfying the requirements of claim 17 and similar claims regarding rotational offsetting.

Without prejudice, Applicants have amended claims 1, 22, 45 and 63. The claims now require that a die which is stacked on top of other die be at least partially electrically connected directly to the substrate. The references as combined by the Examiner do not teach this element. Burns and Knopf, the only references used to teach the external connecting of semiconductor die, do not refer to the connection of upper, laterally-displaced stacked die to a substrate. Burns

is directed toward two die connected to either side of a substrate, and thus does not pertain to stacked die. Abstract; Col 2, lines 46-51; Fig. 2. Knopf is directed toward electrically connecting stacked die to the die directly below. Col 2, lines 14-27; Figs. 4 and 5.

Additionally, as Khandros is used in the Office Action, it would be expected to also teach “the backside of a first semiconductor die being attached to the surface of the substrate adjacent the conductive bond areas of said surface of said substrate.” However, the lowest die of Khandros is not attached to the substrate. See Figures 1, 1A, 2 and 4-7. The “resilient contacts” provided by Khandros would not be needed otherwise.

Furthermore, none of the five references teach, suggest, or recommend their combination with any *one* of the others, let alone the other four references.

Moreover, the combination of Khandros with Burns is improper. Khandros teaches connections which extend from the bottom of semiconductor die. Col. 2, lines 35-37; Figs. 1-7. These connections have bent sections which cause them to behave like compressible springs, exerting a force which does not stress the bond to the die because the spring is directly in between the substrate and the die. However, upon stress to the lead, an upward facing die which is bonded to a substrate from the die’s upper surface will experience a force on the lead-to-die bond which is contrary to the bond, risking failure of the bond. When modifying one piece of prior art with another to arrive at the conclusion that the combination is obvious, “the proposed modification cannot render the prior art unsatisfactory for its intended purpose.” MPEP 2143.01.

Applicants very respectfully suggest that the picking and choosing of elements from four references, at least some of which not properly combinable, as elucidated above, suggests a hindsight motivation for the combination and cannot establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the presently claimed invention.

Applicants respectfully request that the rejection of independent claims 1, 22, 45 and 63 be withdrawn as they are deemed allowable for the reasons above. Furthermore, claims 2, 4, 5, 17, 20, 23, 25, 26, 35, 38, 40, 46, 48, 65, 66 and 80 are allowable as depending from allowable independent claims.

Applicants request the allowance of claims 1, 2, 4, 5, 17, 20, 22, 23, 25, 26, 35, 38, 40, 45, 46, 48, 63 through 66, and 80 and the case passed for issue.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "James R. Duzan". The signature is fluid and cursive, with a long horizontal stroke at the end.

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